

ON THE SESSION OF THE US-USSR JOINT
WORKING GROUP IN THE FIELD OF SCIENCE POLICY

(Moscow, September 23-27, 1974)

STATINTL

In accordance with the decision adopted at the
Second Session of the US-USSR Joint Commission on Scientific-
Technical Cooperation (November 1973), a meeting was held
in Moscow during the period September 23-27 of the US-USSR
Joint Working Group in the Field of Science Policy, and
of working subgroups in the areas of:

Planning and Management of Scientific Research
and Development;

Financing Research and Development;

Training and Utilization of Scientific and Engineer-
ing-Technical Personnel;

Systems of Stimulating Development of Fundamental
Research.

The results of the activities of the Working Group
during the past period were reviewed at these sessions and
detailed plans of work, including related methodological
questions, were discussed. As a result of frank and com-
prehensive discussion of questions of science policy, the
American-Soviet working subgroups (see attached list)
developed fully agreed upon proposals for further coopera-
tion in the indicated areas within the framework of the
Joint Commission.

State Dept. declassification & release instructions on file

David Z. Beckler

D.Z. Beckler
Co-Chairman American side

Ye. I. Sklyarov

Ye. I. Sklyarov
Co-Chairman Soviet side

US-USSR Joint Working Group
in the Field of Science

in the Field of Science

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Science Policy

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LIST OF EXPERTS WHO PARTICIPATED
IN THE SESSIONS OF THE US-USSR JOINT WORKING
GROUP ON SCIENCE POLICY, SEPTEMBER 23-27, 1974 IN MOSCOW

D.Z. Beckler Chairman of the American side of the
Working Group on Science Policy,
National Academy of Sciences of the US

Ye. I. Sklyarov Chairman of the Soviet side of the
Working Group on Science Policy,
State Committee of the Council of
Ministers USSR On Science and
Technology (SCST)

Subgroup I: "Planning and Management of Research and
Development"

American Side

W. Carey Chairman, A.D. Little and Co.
J. Berliner Brandeis University
P.M. Cocks Stanford University
H.B. Lyon, Jr. National Science Foundation
N. Robertson Air Products and Chemicals, Inc.

Soviet Side

Ye. I. Sklyarov Chairman, SCST
K.A. Yefimov State Planning Committee USSR
I.D. Ivanov Institute of the USA of the Academy of
Sciences
K.I. Toksir Institute of Economics of the Academy of
Sciences
Yu. M. Sheynin Institute of History of Natural Sciences
and Technology of the Academy of
Sciences

A.S. Yurkevich SCST

V.V. Sladkov SCST

Subgroup II: "Financing Research and Development"

American Side

L. Steele Chairman, General Electric Company

A.E. Nimitz Rand Corporation

W. Stewart National Science Foundation

C. Falk National Science Foundation

Soviet Side

Ye. Ye. Grishayev Chairman, SCST

L.Z. Glyazer Institute of Economics of the Academy
of Sciences, USSR

Yu. K. Petrov State Planning Committee

V.I. Maslennikov Institute of the USA of the Academy of
Sciences

S.I. Pirogov Institute of Economics of the Academy
of Sciences

D.M. Lyubimova Central Statistical Administration

S.A. Sitoryan Ministry of Finance

Subgroup III: "Training and Utilization of Scientific and
Engineering-Technical Personnel"

American Side

D. Wolfle Chairman, University of Washington

C.V. Kidd American Association of Universities

T.J. Mills National Science Foundation

M. Feshbach Department of Commerce

R.W. Cain National Science Foundation

S. Kassel Rand Corporation

Soviet Side

| | |
|--------------------|--|
| V.I. Krutov | <u>Chairman</u> , Ministry of Higher and Specialized Secondary Education |
| S.R. Mikulinskiy | Institute of History of Natural Sciences and Technology of the Academy of Sciences |
| S.A. Kugel' | Leningrad Division, Institute of History of Natural Sciences and Technology |
| Ye. N. Zhil'tsov | Moscow State University |
| A.S. Ryabinin | Moscow State University |
| M.M. Poluboyarinov | Central Statistical Administration |
| B.M. Remennikov | Ministry of Higher and Specialized Secondary Education |
| V.N. Andriyeshin | SCST |

Subgroup IV: "System of Stimulating the Development of
Fundamental Research"

American Side

| | |
|--------------|--------------------------------------|
| H. Shull | <u>Chairman</u> , Indiana University |
| D.A. Bromley | Yale University |
| N.B. Hannay | Bell Laboratories |
| R.S. Hoffman | Kansas University |
| D.Z. Beckler | National Academy of Sciences |

Soviet Side

| | |
|----------------|---|
| V.A. Filippov | <u>Chairman</u> , Academy of Sciences |
| S.V. Nemchinov | Academy of Sciences |
| N.M. Kiselev | Academy of Sciences |
| O.I. Larichev | Ministry of Precision Instrument Building, Means of Automation and Control Systems |

V.S. Boychenko

Ministry of Precision Instrument Building,
Means of Automation and Control Systems

M.K. Albertyan

Ministry of Precision Instrument Building,
Means of Automation and Control Systems

ATTACHMENTS:

- I. Summary Report of the Measures Taken on Cooperation in the Field of Science Policy
- II. Explanatory Note to the Agreed Plan of Work for Scientific-Technical Cooperation Between the US and USSR in the Field of Science Policy
- III. Revised Program of Future Work in Accordance with the Topics of Cooperation in the Field of Science Policy Agreed Upon During the Period November 19-23, 1973.
- IV. Reports and Plans of Future Work of the Subgroups of Experts of the Working Group in the Field of Science Policy

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SUMMARY REPORT OF THE MEASURES TAKEN
ON COOPERATION IN THE FIELD OF SCIENCE POLICY

In accordance with the subjects of cooperation in the field of science policy approved at the second session of the US-USSR Joint Commission on Scientific and Technical Cooperation, organizational steps were taken on the following topics:

Planning and management of scientific research and development;

Financing research and development;

Training and utilization of scientific and engineering manpower;

Systems of stimulating the development of fundamental research.

Working subgroups were created for each of the study topics, and the scientific organizations which should be involved in the performance of the work were identified. There has been an exchange of lists of questions on the subjects of cooperation for review and response. Then each side identified the questions which were of greatest interest to it. In the area of fundamental research, the Soviet side has prepared and already transmitted to the American side answers to the questions posed by the American side and at the same time has received answers to its questions.

In addition, within the framework of the Joint Group of Experts on Science Policy, an American/Soviet conference on questions of organization and management of industrial research and development was held in Washington during June 1974. Four Soviet and six American representatives delivered papers at this conference (the papers are to be published in the U.S. and U.S.S.R. in the next six months).

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During its stay in the U.S., the Soviet delegation was given the opportunity of visiting scientific centers and enterprises in New York, Los Angeles and San Francisco, Similarly, during the period September 15-October 4, 1974, members of the American delegation visited scientific centers and scientific production associations in Moscow, Novosibirsk, Leningrad and Kiev.

Thus, the preliminary stage of work has been completed.

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EXPLANATORY NOTE ON THE AGREED PLAN OF WORK FOR
SCIENTIFIC-TECHNICAL COOPERATION BETWEEN
THE U.S. AND U.S.S.R. IN THE FIELD OF SCIENCE POLICY

The detailed plan for further work reflects the agreement of the sides on the form of cooperation and type of results desired.

The sides agreed that during the period 1975-1976, survey reports will be prepared which characterize the national systems of planning and management of scientific research and development, the financing of research and development, the training and utilization of scientific and engineering-technical personnel, and stimulation of the development of fundamental research. For all four topics, preliminary plans for the survey reports were agreed.

In order to study how the national systems of planning and management in the area of science policy function in practice, the sides have agreed to examine the processes on the basis of individual examples and case studies.

As to planning and management of research and development, financing of research and development, and training and utilization of scientific and engineering-technical personnel, the sides agreed on the possible types of problems which can be worked out in the future for more detailed study. A list of case studies was agreed upon for the work concerning stimulation of the development of fundamental research.

In connection with the specification of the problems to be studied in each of these four topics, agreement was reached on the use of various methods of carrying out the work. In particular, on the topic of financing of science (research

and development) the sides agreed to append to the reports statistical data characterizing expenditures on science during the calendar years 1970-1973, inclusive.

As to the training and utilization of scientific and engineering-technical personnel, the sides agreed to exchange curricula, study programs, and statistical tables.

The work plan on fundamental research also includes the joint conduct of a review of the current status of atmospheric modelling and weather forecasting.

The sides have agreed on the organizational forms of carrying out the work for each topic and the timing for reaching the specified goals. In particular, it is stipulated that, in addition to direct correspondence during the course of the work, there will be meetings and consultations of the subgroup leaders and the mutual exchange of experts in the conduct of the work.

REVISED PROGRAM OF FURTHER WORK IN ACCORDANCE
WITH THE TOPICS OF COOPERATION IN THE FIELD OF
SCIENCE POLICY AGREED UPON DURING NOVEMBER 19-23, 1973

I. Planning and Management of Scientific-Research and Development

1. By December 1974, short answers to each question will be prepared and exchanged. Analysis of the answers and the issues meriting detailed study will be completed by February 1975.
2. During subsequent joint meetings, the topics of detailed studies will be approved, the first such session will take place in March 1975 at which time it is expected that the topics of at least two case studies will be reviewed and approved.
3. Both sides will send experts to review any questions which arise.
4. In accordance with the planned activities, each side will submit to the other by September 1975, its survey reports taking into account the six subjects agreed upon in November 1973 and the answers to the questions posed by the sides. By December 1975, the sides will exchange additional information based on the materials received.
5. During February 1976, there will be a final joint review and agreement on the prepared materials, and in April of 1976, the agreed upon materials, together with necessary revisions, will be submitted as the product of the work on the subject "Planning and Management of Research and Development."

II. Financing of Science (Research and Development)

1. By November 1974, the sides will exchange comments on the corrected preliminary outlines of the survey reports. Each side will submit their comments on the revised outlines by January 1975. A small group of experts will meet during the first quarter of 1975 (date to be decided later) for consideration of questions in connection with the preparation of the survey reports.
2. The experts of both sides will meet in September 1975 in order to review questions generated after examination of the survey reports with the aim of agreeing on preliminary plans for preparing scientific papers on comparative analyses. The papers on comparative analyses will be completed by December 1975.
3. Study groups will meet in the first quarter of 1976 to review the comparative analyses and to agree upon proposals for the plan, content and procedure for preparing the summary report.
4. Discussion and approval of the final report will take place at the working session of the joint working subgroup by June 1976.

III. Training and Utilization of Scientific and Engineering-Technical Personnel

1. By November 1974 the sides will exchange available instructional materials, individual curricula and course programs in order to compare the level of training of specialists with higher education in a number of fields.

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2. For more profound study of the methods used in preparing the statistical tables and content of the final reports, the sides will exchange visiting foreign experts for a period up to three months (first quarter of 1975).

The sides have agreed that, as may be necessary, there will be short visits of 1-2 experts to resolve questions which arise during the course of the work.

3. The sides will exchange tables containing statistical data for one year or one field, together with appropriate comments on their content by March 1975.
 4. By March 1975, the sides will submit to each other an outline of the survey report, taking into account paragraphs 1 and 2 of theme III of the Program for Scientific-Technical Cooperation Between the U.S. and U.S.S.R. in the Field of Science Policy, in order to have a discussion of the report in October 1975.
 5. By June 1975, there will be an agreed-upon list of problems which require in-depth study.
 6. In October 1975, there will be a joint meeting of the subgroup for a discussion and agreement on the materials submitted by each side they deem necessary for the final report.
 7. By May-June 1976 there will be the elaboration and joint delivery of the survey reports in accordance
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with the program of scientific-technical cooperation.

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IV. Stimulation of the Development of Fundamental Research

1. Each side will prepare a detailed draft outline of the survey reports on national systems for stimulation of the development of fundamental research.

The sides will exchange these drafts by the end of 1974. Within 2 months thereafter, there will be an exchange of comments on the drafts.

2. After consultation with a national group of experts, groups of experts will meet in the spring of 1975 to discuss the two draft outlines, as well as comments on these drafts, and to agree upon the final outlines of the national survey reports.

3. At the initial stage of work on the survey reports, there will be an exchange of visits of experts (2-3 weeks duration).

4. By August 1975, there will be an exchange by the sides of the draft survey reports. By October 1975, a meeting of the experts and study groups will take place in order to exchange comments on the prepared survey papers and to decide on the final report and develop recommendations for continued cooperation.

In addition, the sides will carry out work on the preparation of information for case studies. In particular,

1. By the end of 1974, each side will exchange detailed outlines of the description of selected case studies.

Within a two-month period, the sides will exchange comments on the detailed outlines. During the

writing of the case studies, there will be exchange

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of experts, as may be mutually agreed.

2. By August of 1975, the sides will exchange reports which contain the results of the case studies.

The sides will exchange comments on the materials received within the following six weeks.

3. The final documents will be prepared by October 1975.

4. The sides have agreed on the desirability of carrying out a joint technical assessment on the status of atmospheric modelling and weather forecasting in accordance with the work program.

REPORTS AND PLANS OF FURTHER WORK OF THE SUBGROUPS
OF EXPERTS OF THE US-USSR JOINT WORKING GROUP IN THE FIELD
OF SCIENCE POLICY.

I. The American and Soviet parties participating in the Moscow meeting have achieved all the objectives in a spirit of fruitful discussions. Both parties expect that successful exchanges of experience in the planning and administration of science and technology will result in advances in human and economic development.

II. The main task of the Moscow meeting was to consider means for implementing the decisions of the second session of the Joint US-USSR Commission on Cooperation in Science and Technology, in which the following topics of science policy were identified:

- Planning and administration of R&D
- Financing R&D
- Training and utilization of scientific and engineering personnel
- System of stimulating the development of fundamental research

Working groups have been formed for all these topics and supporting institutions identified for fulfilling the work. Exchanges of questions have been completed by all four groups.

III. The accomplishments for the group on management and administration thus far are substantial.

A program of cooperation was prepared.

As a result of mutual exchange, members of the US-USSR delegations visited a number of governmental, scientific and

industrial facilities so that each side could become more familiar with science policy practices of the other country.

Lists of questions, which have been exchanged, have been found acceptable for consideration. During the Moscow meeting the feasibility of preparing answers has been agreed to. Each aide has informed the other as to which questions have the most importance.

A conference on the organization and management of industrial R&D was arranged and held in June 1974 in the U.S. Seven U.S. presentations and four Soviet presentations were given.

The seven American presentations were:

- Commercialization of the Gulf Residual H.D.S. Process, by Mr. A.M. Henke, Gulf Research and Development Company.
- Laser Processing of Materials: a case study of the development and introduction of a new manufacturing technique, by Mr. T.P. Long, Western Electric Corporation.
- Impact of Computer Technology on Research Productivity, by Mr. Richard Shuey, General Electric Company.
- Factors Influencing the Productivity of Industrial R&D Organizations, by Mr. Edward Shanley, Arthur D. Little, Inc.
- Transfer of Chemical Technology through Patenting and Licensing, by Mr. Willard Marcy, Research Corporation.

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- Techniques Used to Facilitate the Transfer of Research from Universities to Industry, by V. Drovovitz/Dvobovitz and Associates

The four Soviet presentations were:

- O.I. Larichev (Institute of Control Problems), "The Selection of Preferred Variants of a Project"
- O.V. Filatov (General Director of the "Svetlana" Association), "The Transfer of Scientific Research and Development from Laboratories to Production"
- S.V. Nemchinov (Deputy Head of the Science-Organization Department of the USSR Academy of Sciences), "Organizational Forms of Transferring the Results of Basic Research Into Industry"
- K.A. Efimov (Head of a Department at the USSR GOSPLAN), "Organization of the Elaboration and Realization of Large Interbranch Scientific and Technological Programs"

The participants in the Moscow meeting agreed that the preparation of texts and the publication of these presentations by both the U.S. and the USSR will be completed within six months.

IV. Looking to the immediate future, the participants on R&D Organization and Administration are in full agreement on the following points.

- An initial short response by each side to all questions will be exchanged within 2 months (December 1974).
- Upon receiving these initial answers, they will be analyzed by the respective sides. This analysis will identify those areas of R&D management and planning which merit study in greater depth. This work will be

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- Future joint meetings will approve the topics to be studied in more detail. The first meeting will be in March 1975, at which time case study topics will be considered and approved. At the time a case study is approved by both sides, a two-month period will be allowed for exchange of outlines. These outlines will contain statements which define the structure, contents, methodology, approach, and participants responsible for the conduct of the case study.
- Both sides agree that there will be at least two topics on each side which will require case studies. These case studies will require the mutual exchange of experts during the next year for extended periods of time. These expert visits will be to a specific facility for a specific task. The parties will strive to select case studies on common topics. Among the kinds of studies would be experience with cost effectiveness in planning R&D, methods of project management, and factors which influence utilization of R&D results.
- In general, both sides agree to a flexible approach to the analysis of the questions. Besides the previously-mentioned case studies, a variety of methods are considered appropriate including special papers, conferences, and group meetings, and possibly other methods.

V. In accordance with the planned activities:

- By September 1975 each side will submit to the other side its survey reports, taking into account the

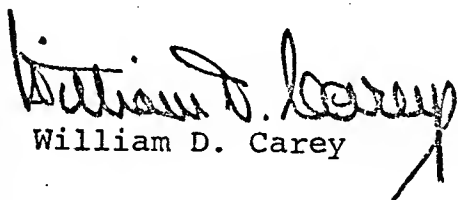
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answers each side has given to the questions,

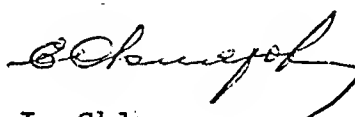
and reflecting the six principal issues which were agreed to in November 1973 as subjects for consideration.

- By December 1975 the sides will conduct an exchange of additional information on the material received.
- In February 1976 there will be some mutual consideration of the prepared materials.
- In April 1976 the agreed-upon materials, revised as may be necessary, should be submitted to constitute the outcomes of the activities on Subject I -- the planning and administration of scientific research and development.

VI. Conclusion

Both sides recognize that the work program will require serious commitment of national support, and that a successful result can establish a promising foundation for continued exchanges of knowledge in the years to come. In this spirit, the two sides consider the Moscow meeting a milestone on the road to lasting cooperation based on understanding.


William D. Carey


Ye. I. Sklyarov

RECORD OF DISCUSSION OF THE MEETING OF
THE U.S.-USSR JOINT GROUP OF EXPERTS ON
THE FINANCING OF SCIENCE (RESEARCH AND DEVELOPMENT)
SEPTEMBER 23-26, 1974

In accordance with the program for cooperation in the field of science policy approved by the Second Session of the Joint Soviet-American Commission, the working subgroup on financing research and development has been formed and papers outlining the general areas of interest and proposed scope of studies to be undertaken have been exchanged.

The working subgroup on financing research and development has concluded that the initial (preparatory) phase of the work of the Program adopted at the November 1973 meeting should be extended, in view of the fact that elaboration of mutually agreed upon methodological principles requires detailed and comprehensive study.

After exchanging opinions, both sides have agreed on the basic principles of future work:

(1) Preparation of surveys, "The system of financing research and development in the U.S." and "The system of financing science in the USSR", which shall pay particular attention to illuminating methodological problems. The surveys will be prepared by working groups of experts of the U.S. and USSR, respectively. Target date for completion: by 30 June 1975.

- a. Preliminary outline of survey reports attached.
- b. Each side to exchange by November 1974 revisions and clarifications of the preliminary outline.
- c. Each side to comment on revised outline proposed

by the other side by January 1975

- d. Small group of experts to meet during the first

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consider problems in connection with the preparation of the survey reports.

(2) Experts to meet in September 1975 to review and discuss questions generated after the examination of survey reports with the aim of coming to an agreement on preliminary plans for preparing scientific papers on comparative analyses.

(3) Each side will prepare scientific papers on comparative analyses with their findings on the following problems: similarities and differences between the respective systems of financing; selection of indicators for comparison; elaboration of principles and methods of comparison. Scientific papers on comparative analyses should be finished by December 1975. In case of necessity while preparing the above mentioned material, there can be working consultations of experts.

(4) Study groups to meet to review and discuss comparative analyses during the first quarter of 1976 (date to be decided later) and agree on proposals for the plan, content and procedure for preparing the summary report called for by the program of cooperation.

(5) The draft of the final report should be prepared by the experts of both countries. Discussions and approval of the final report at a working meeting of the Joint Study Group by June 1976.

(6) Both sides recognize that in the course of fulfilling the proposed program there can appear a necessity for more detailed studies of a number of complex problems which would require joint studies (for example, incentives for scientists and others working in Research and Development, composition of overhead expenses, etc.). Additional proposals for topics, methods and procedures of

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such studies will be exchanged by correspondence and considered at the next scheduled meeting of experts (mentioned in item 1d above) who will then make appropriate recommendations to the chairmen of the working subgroup. The chairmen will decide the action to be taken.


Ye. Ye. Grishayev

Chairman of the Soviet side
Working Subgroup on Financing
Research & Development


Lowell Steele

Acting Chairman of the U.S.
side Working Subgroup on
Financing Research & Development

Preliminary Outline of Survey Reports

1. Objectives of the survey report.
2. Descriptions and definitions of the concepts of "science" in the Soviet survey report and "research and development" in the American survey report including definitions of the boundaries between science (research and development) and other activities with the aim of defining those funds which are used for science (research and development).
3. Descriptions of classes of organizations performing research and development and financed by funds for science.
4. Descriptions of the manner in which funds for science (research and development) are planned.
5. Descriptions of methods for reviewing and controlling expenditures of performers.
6. Descriptions of the composition of the major cost elements of science (research and development).
7. Descriptions of the mechanisms for financing science (research and development).

STATISTICAL TABLES TO BE PROVIDED
(1970-1973 calendar years)

(Each table will include definitions of terms used.)

- I. Total expenditures distributed by appropriate classes of performing organizations.
- II. Total expenditures distributed by type of scientific work (basic research, applied research, development), using estimates if necessary.
- III. Total operating expenditures distributed by sources of financing.

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IV. Total operating expenditures distributed by cost element (wages and salaries, equipment, materials, etc.) using estimates if necessary.

RECORD OF DISCUSSIONS OF THE MEETING OF THE
SUBGROUP ON THE TRAINING AND UTILIZATION
OF SCIENTIFIC AND ENGINEERING-TECHNICAL
PERSONNEL OF THE U.S.-U.S.S.R. JOINT GROUP
OF EXPERTS IN THE FIELD OF SCIENCE POLICY

(Moscow, U.S.S.R., September 23-25, 1974)

The subgroup met in Moscow to review progress, to further the plan of work and to agree upon a schedule for completion of its portion of the Program of Scientific and Technical Cooperation between the U.S. and the U.S.S.R. in the Field of Science Policy that was adopted by the Joint Group of Experts in the Field of Science Policy on November 23, 1973.

The U.S. and U.S.S.R. members of the subgroup who participated in the meeting are listed in Attachment 1.

In accordance with the agreement reached at the joint meeting in Washington on November 19-23, 1973, the two sides have exchanged information and statistical table shells which should be filled with data to be provided by each side. This information is concerned with the problems of training and employment of scientific and engineering technical personnel in the USSR and in the USA which are the subject of the third program of scientific-technical cooperation between the two countries in science policy.

The materials delivered by the two sides differed somewhat in approach and such points as the methods of estimation and degree of detail in the table shells and in the concepts and categories which are in the schemes.

These discrepancies arise from differences in the methodology of statistical records available in the two countries.

The table, shells, 22 concerning the USA and 17 concerning the USSR, provided the basic topic for discussion at the joint meeting of the Soviet and American experts on September 23-25, 1974.

As a result of the discussion an agreement was reached on the forms and content of the tables.

The two sides elaborated the following calendar plan of the second stage of the investigation on the theme "Training and Employment of the Scientific and Engineering-Technical Personnel".

1. The two sides will exchange available instructions which permit understanding of the methods used by the sides in collecting the necessary statistical data for preparing tables. In addition, there will be an exchange of examples of curricula and of course programs for the training of specialists at the baccalaureate level in physics, botany and civil engineering, November 1974.

2. For more profound study of the methodologies for preparation of the statistical tables and the content of final reports, both sides will exchange visiting foreign specialists for a period of up to three months, first quarter 1975. Both sides have agreed that short visits of one or two persons, as may be necessary, may be arranged at any time during the course of the work in order to obtain agreement on any problems which have arisen.

3. The sides will exchange tables containing statistical data for one year or one field of each of the subject tables

with the corresponding methodological comments on their composition, March 1975. By March 1975 the sides will submit to each other a prospectus of the contents of the survey report, including the subjects detailed in paragraphs 1 and 2 of theme III of the Program of the Scientific and Technical Cooperation between the USA and the USSR in the field of science policy; this will be done in anticipation of the meeting in October 1975.

In preparing the outlines, each side will identify and exchange lists of a small number of important questions that each believes should be made the subject of in-depth analysis by specially convened experts on both sides. Such questions might include, for example:

- a. Differences in the level, breadth, and specialization of education of engineers.
- b. Comparative study of education for the Kandidat in the USSR and the Ph.D in the USA.
- c. Method of planning or predicting future needs for scientists and engineers.
- d. Or others.

By June 1975 the two sides will agree upon which problems require special in-depth comparative studies and on the study procedures.

4. The study of the material delivered to the other side and exchange of any questions concerning the materials, June 1975.

5. Making precise the tables and methodologies of their composition previously submitted. Have a discussion and agreement on the materials submitted by each side necessary for the final report at a joint meeting of the subgroup October 1975.

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6. The elaboration and joint delivery to each other of the Report noted in theme III, related to "Training and Employment of the Scientific and Engineering-Technical Personnel" in accordance with the Program of the Scientific-Technical Cooperation between the USSR and the USA in science policy.
May - June 1976.

h. Reppins

Dale Wolfe

Participants in the meeting of the subgroup on Scientific and Engineering-Technical Personnel, Moscow, U.S.S.R., September 23-25, 1974.

U.S. Participants:

Dr. Dael Wolfle, Chairman, Professor of Public Affairs, University of Washington

Mr. Robert Cain, Head, Manpower Studies Section, National Science Foundation

Mr. Murray Feshbach, Chief USSR/East Europe Branch, U.S. Department of Commerce

Mr. Simon Kassel, The Rand Corporation

Dr. Charles V. Kidd, Executive Secretary, Association of American Universities

Mr. Thomas J. Mills, Arlington, Virginia

U.S.S.R. Participants:

V.I. Krutov, Chairman, Ministry of Higher and Specialized Second Education

S.R. Mikuhinskiy, Institute of History of Natural Sciences and Technology

S.A. Kugel', Leningrad Division, Institute of History of Natural Sciences and Technology

Ye. N. Zhil'tsov, Moscow State University

A.S. Ryabinin, Moscow State University

M.M. Poluboyarinov, Central Statistical Administration

B.M. Remennikov, Ministry of Higher and Specialized Second Education

V.N. Andriveshin, State Committee for Science and Technology

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RECORD OF THE JOINT WORK OF THE SUBGROUP
ON THE PROBLEM "SYSTEMS OF STIMULATING
THE DEVELOPMENT OF FUNDAMENTAL RESEARCH"
WITHIN THE FRAMEWORK OF THE AMERICAN-SOVIET
COOPERATION IN THE FIELD OF SCIENCE POLICY

(Moscow, September 23-25, 1974)

In accordance with the approved program of scientific and technical cooperation in the field of science policy, a subgroup of experts in "Systems of Stimulating the Development of Fundamental Research" met in Moscow September 23-25, 1974. In attendance at the meeting were:

From the American side:

H. Shull, Indiana University, Co-chairman
D. A. Bromley, Yale University
W. B. Hannay, Bell Laboratories
R. S. Hoffman, University of Kansas
D. Beckler, U.S. National Academy of Sciences

From the Soviet side:

V. A. Filippov, USSR Academy of Sciences, Co-chairman
S. V. Nemchinov, USSR Academy of Sciences
N. M. Kiselev, USSR Academy of Sciences
O. I. Larichev, Institute of Control Problems
V. S. Boychenko, Institute of Control Problems
M. K. Albertyan, Institute of Control Problems

The following questions were discussed at the meeting.

1. Results of the work during the period following approval of the work plans. Both sides take a positive view of the results of the work since the agreement of November 1973.

2. Goals and detailed plans for carrying out work in the following directions:

- a. Preparation of surveys which characterize the national systems of stimulating the development of fundamental research;
- b. Preparation of case studies illustrating the process of decision making;
- c. Preparation of joint surveys which include critical analyses of the current status of specific fields of fundamental research.

In the course of the discussions, both sides came to agreement on the possible means of cooperation on each question under discussion and have elaborated specific plans of further work.

I. Surveys Characterizing National Systems of Stimulating the Development of Fundamental Research

Surveys will be prepared which contain a description of the basic features of the systems for the formulation of national science policy in the U.S. and the U.S.S.R. in the area of fundamental research, the management of fundamental research and the transfer of the results of fundamental research to application.

To facilitate the comparison of the systems, a common approach will be used by both sides in the preparation of parallel surveys. It is agreed that the surveys will be analytical in nature and will contain critical analysis of the systems being described. The assessment of the strengths

and weaknesses of the systems will be illustrated by examples from the field of physics.

Attachment 1 contains the agreed plan of work on the surveys. Attachment 2 contains a preliminary outline of the surveys. These agreed-upon plans will be the basis of the future joint work.

II. Case Studies Characterizing the Process of Decision-Making in the Area of Development of Fundamental Research

Both sides have agreed to prepare a number of in-depth case studies in order to analyze the processes of decision-making concerning problems of developing and implementing national policies for fundamental research. These case studies are intended to analyze how the national systems of planning and decision-making in the area of fundamental research work in practice.

Attachment 3 contains a list of agreed case studies. Attachment 4 contains an agreed plan of work for the case studies.

III. Critical Reviews of the Current Status of Specific Fields of Fundamental Research

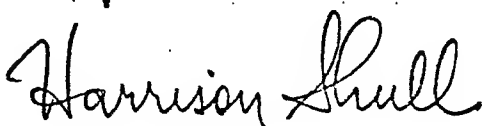
The approved program of scientific and technical cooperation between the U.S. and the USSR in the area of science policy includes as a subject of cooperation joint analysis and assessment of scientific questions of mutual interest which can have important influence on national problems.

The joint working subgroup on the system of stimulating the development of fundamental research

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recommend to the National Academy of Sciences of the U.S. and the Academy of Sciences of the U.S.S.R. that they undertake jointly an assessment of the status of research in the area of atmospheric modelling and weather forecasting. This assessment of the status of research in this field would build on a long and effective tradition of cooperation between the two countries in collection and exchange of atmospheric data, and would contribute to the existing cooperation between the countries, as well as to worldwide international cooperation.

Attachment 5 contains a plan for joint work on the given problem.



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PRELIMINARY OUTLINE FOR THE PREPARATION
OF SURVEYS CHARACTERIZING THE NATIONAL
SYSTEMS OF STIMULATING THE DEVELOPMENT
OF FUNDAMENTAL RESEARCH

1. Each side will establish organizational mechanism to prepare the survey.
2. Each side will establish a group of experts who will have responsibility for the contents of the survey. The group of experts will include prominent physicists.
3. Each side will prepare a detailed draft outline of its national survey. The sides will exchange these draft outlines by the end of 1974. Within the following two months there will be an exchange of comments on the prepared draft outlines.
4. After consultations with their national group of experts there will be a meeting of the national study groups in the spring of 1975 to discuss both draft outlines and agree on the final outline of the surveys.
5. In the initial stage of work on the surveys, representatives of the study groups will exchange visits (2-3 weeks duration).
6. The survey papers as initially prepared by each side will be exchanged by August 1975, followed by a joint meeting of the experts and study groups by October 1, 1975 to exchange comments on the prepared survey papers and to prepare a general report and formulate recommendations for continued cooperation.

- I. The development of science policy for fundamental research.
 1. Definition of the term "science policy for fundamental research"
 2. The need for developing a science policy for fundamental research
 3. The formulation of science policy for fundamental research
 - a. Factors which influence science policy for fundamental research
 - (1) overall governmental policy and objectives
 - (2) the scale of overall expenditures for research and development
 - (3) the goals and levels of financing research and development from governmental and private sources
 - (4) the level of development of various scientific fields
 - (5) the available financial and trained manpower resources

NOTE: The surveys shall be written in order to facilitate mutual understanding and inter-comparison of US and USSR systems for fundamental research. Thus survey will draw on examples from the field of physics to illustrate the processes of planning and management of fundamental

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- b. Difficulties in the formulation and implementation of national science policy for fundamental research
 - c. Existing mechanisms for formulation of science policy for fundamental research
 - d. Methods of implementing science policy for fundamental research
 - 4. Retrospective analysis of the results of implementing through a number of years a certain science policy for fundamental research
 - 5. Analysis of alternative methods and alternative organizational arrangements for the development of national policy for fundamental research
- II. The management of fundamental research
- 1. Definition of the term "management of fundamental research"
 - 2. Methodological aspects of fundamental research management
 - a. in the area of forecasting
 - b. in the area of planning: short term, medium term, long term
 - c. in the determination of priorities within and among fields of fundamental research
 - d. in the formulation of programs, the determination of the amount of resources and their allocation for fundamental research

- e. in the creation and development of centers for fundamental research, their geographic distribution, and the allocation of resources among new and existing centers
 - f. in the planning of unique and expensive experimental facilities for fundamental research
 - g. in the planning and coordination of multi-disciplinary research
 - h. in the planning of fundamental research in meeting particular societal needs
 - i. in the termination of non-promising areas of research investigation and the redirection of efforts of research institutions
 - k. in the use of management information systems in decision making for fundamental research
- 3. Existing organizational mechanisms in the fundamental research management system, their structure and effectiveness
 - 4. Analysis of alternative methods and alternative organizational arrangements for the management and conduct of fundamental research
- III. The role of higher educational institutions, research institutes, and industrial research organizations in the conduct of fundamental research

IV. Transfer of the results of fundamental research to application

1. Critical analysis of the state of the problem
 - a. existing organizational arrangements and management procedures for transferring the results of fundamental research to application and trends in their development
 - b. the existing system for planning and stimulation of activity in the transfer of fundamental research to application, i.e., science application
 - c. advantages and disadvantages of existing organizational arrangements and methods of management and stimulation of the transfer of results of fundamental research to application
2. Development and analysis of possible organizational arrangements and methods for the transfer of the results of fundamental research to application
 - a. possible alternative organizational forms and methods of management (planning, etc.)
 - b. possible alternative methods to facilitate the transfer of the results of fundamental research to application

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c. the social and psychological aspects of the problem

3. Analysis of possible means of improving existing systems for transferring the results of fundamental research to application. Questions concerning the peculiarities of the systems for safeguarding patents, copyrights, know-how, etc., export and import licenses, industrial secrecy, etc.

LIST OF AGREED CASE STUDIES CONTAINING
RETROSPECTIVE ANALYSES OF DECISION-MAKING
PROCESSES IN THE AREA OF FUNDAMENTAL RESEARCH

1. Decision-making in the Development of a Unique Scientific Facility.

U.S.: A study of the decision to construct a large radiotelescope, the VLA

U.S.S.R.: A study of the decision to construct a large optical telescope

2. Organizational Mechanisms for Initiating New Fundamental Research Projects.

U.S.: A series of "ministudies" on several areas of fundamental research in which new initiatives have recently been taken

U.S.S.R.: A study of the development of organizational structure to undertake fundamental research on the problem of numerical methods of weather forecasting.

3. Resource Distribution in a Complex System of Organization of Scientific Research, Problems of Organization and Development of Scientific Centers.

U.S.: Brookhaven National Laboratory

U.S.S.R.: The Scientific City of Novosibirsk or Pushchino

4. Utilization of the Results of Fundamental Research in Allied Problems.

Examples will be selected by each side within a

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5. Retrospective Analysis of the State of Fundamental Research.

U.S.: A comparative study of two reports in the field of physics.

U.S.S.R.: A retrospective analysis of forecasting in the field of physics.

6. Comparative Analysis of Competing Organizations.

U.S.: A study of the procedures for the allocation of resources among research centers for materials science.

U.S.S.R.: A study of the selection process in the allocation of resources among scientific institutions engaged in the same field of research.

WORK PLAN FOR THE PREPARATION OF CASE STUDIES

1. Each side will develop organizational mechanisms for the preparation of description and analysis of the selected case studies.
2. Each side will exchange detailed draft outlines of the selected case studies by the end of 1974.
3. Within the following two months, the sides will exchange comments on the detailed draft outlines.
4. During the time of the writing of the case studies there will be exchanges of experts as mutually agreed upon.
5. The sides will exchange reports on the results of the case studies by August 1, 1975.
6. In the course of the following six weeks, the sides will exchange comments on the materials received.
7. The final documents must be completed by October 1, 1975.

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PLAN OF WORK FOR THE PREPARATION OF THE
JOINT AMERICAN-SOVIET REPORT ON THE SUBJECT
"ATMOSPHERIC MODELLING AND WEATHER FORECASTING"

1. Each side will establish a group of experts and inform the other side of its membership and chairman.
2. After an exchange of correspondence between the chairmen of the expert groups, each side will prepare an outline of a survey of the current state of atmospheric modelling and weather forecasting. The draft outlines will be exchanged by January 1, 1975. Within the following two months there will be an exchange of comments on the draft outlines.
3. The outlines will be combined in an agreed joint outline through correspondence or, if necessary, at a meeting of representatives of the two expert groups during the spring of 1975.
4. Each side will prepare papers according to the agreed outline. These papers will be exchanged by September 1, 1975 for subsequent study and exchange of comments.
5. There will be a meeting of the groups of experts in the fall of 1975 to discuss and agree on the contents of the overall report.
6. The final text of the joint report will be completed by July 1, 1976.